Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

ACR Appropriateness Criteria® recurrent lower urinary tract infections in women.

Bibliographic Source(s)

Lazarus E, Allen BC, Blaufox MD, Coakley FV, Friedman B, Fulgham PF, Goldfarb S, Hartman MS, Heller MT, Hosseinzadeh K, Oto A, Porter C, Sahni VA, Sudakoff GS, Verma S, Remer EM, Eberhardt SC, Expert Panel on Urologic Imaging. ACR Appropriateness CriteriaÂ® recurrent lower urinary tract infections in women [online publication]. Reston (VA): American College of Radiology (ACR); 2014. 10 p. [50 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Lazarus E, Casalino DD, Remer EM, Arellano RS, Bishoff JT, Coursey CA, Dighe M, Eggli DF, Fulgham P, Goldfarb S, Israel GM, Leyendecker JR, Nikolaidis P, Papanicolaou N, Prasad S, Ramchandani P, Sheth S, Vikram R, Expert Panel on Urologic Imaging. ACR Appropriateness Criteria® recurrent lower urinary tract infection in women. [online publication]. Reston (VA): American College of Radiology (ACR); 2011. 7 p. [47 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Recurrent Lower Urinary Tract Infections in Women

Variant 1: "Uncomplicated" with no underlying risk factors.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis without and with contrast	2		

Radiologic Procedure	Rating	Comments	RRL*
X-ray abdomen	2		
CT abdomen and pelvis without contrast	2		
CT abdomen and pelvis with contrast	2		
X-ray contrast enema	2		
X-ray cystography	2		
MRI pelvis without and with contrast	2	MRI may be indicated if urethral diverticulum is suspected.	O
MRI pelvis without contrast	2		O
US kidneys and bladder retroperitoneal	2		O
X-ray voiding cystourethrography	2		
X-ray intravenous urography	1	This procedure has been supplanted by CT and MR urography.	
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: "Complicated," or patients who are nonresponders to conventional therapy, get frequent reinfections or relapses, and have known underlying risk factors. (See Appendix 1 in the original guideline document.)

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis without and with contrast	7	CT urography protocol is preferred. If enterovesical fistulas are suspected, consider enteric and/or rectal contrast.	
MRI pelvis without and with contrast	6	Consider this procedure for suspected diverticulum or prolapse. This procedure is favored for patients who require repeated imaging examinations.	O
MRI pelvis without contrast	4		O
X-ray voiding cystourethrography	4	Consider this procedure for reflux, bladder or urethral fistula, or prolapse.	
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	4	If urinary stone is not suspected or previously excluded, this procedure can be used for assessment of all other etiologies.	
CT abdomen and pelvis without contrast	4	Consider this procedure when urolithiasis is suspected as the principal etiology. May use as CT cystogram for suspected fistula.	
US kidneys and bladder retroperitoneal	3		O
X-ray intravenous urography	3	This procedure has limited use (or alternative) in young patients if MRI is unavailable or not possible.	
X-ray urethrography double balloon	2		
X-ray abdomen	2		
X-ray contrast enema	2	This procedure may be useful for vesicoenteric fistula.	
X-ray cystography	2	This procedure may be useful for vesicoenteric fistula.	
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Introduction/Background

Urinary tract infections (UTIs) are among the most common bacterial infections in women in the United States. The overall lifetime risk of UTI for women is greater than 50%. Subpopulations at increased risk of UTI include pregnant women, the elderly, patients with spinal cord injuries or catheters, patients with diabetes, multiple sclerosis, human immunodeficiency syndrome, and patients with underlying urological abnormalities. In the nonobstructed, nonpregnant woman, uncomplicated UTIs are usually treated empirically, and respond to appropriate antimicrobial therapy. An uncomplicated UTI is classified as a UTI without structural or functional abnormalities of the urinary tract and without relevant comorbidities. Complicated UTIs are those occurring in patients with underlying structural or medical problems.

Recurrent lower UTIs are usually defined as at least three episodes of infection within the preceding 12 months. Recurrent UTIs involve reinfection from a source outside of the urinary tract or from bacterial persistence. Antibiotic prophylaxis is the most effective way to reduce recurrent UTIs. In most cases, such infections are the result of sexual habits and hygiene (e.g., women who are sexually active, especially those using diaphragms and/or spermatocides). A clean-catch or catheterized specimen for culture typically reveals >100,000 organisms per milliliter of urine. The typical infecting organism is *Escherichia coli*. The route of infection is ascending from the perianal area and vagina via the urethra and into the bladder. UTIs, particularly if severe, may result in gross hematuria. Postmenopausal women are at increased risk for recurrent UTI in the presence of urinary incontinence, cystocele, or high postvoid residuals of urine. Women who have three or more symptomatic infections over a 12-month period may benefit from prophylaxis. Imaging is of low yield in patients without underlying risk factors (see Appendix 1 of the original guideline document) and with lower UTIs as defined above that do not exceed two episodes per year on average, and that respond promptly to appropriate

therapy.

Recurrent and chronic infections with the same organism are termed "relapses" or "persistent" infections. If infection develops more than 2 weeks after a symptomatic cure, or if it is caused by a second pathogen, it is termed a "reinfection." Causes of bacterial persistence include calculi, foreign bodies, urethral or bladder diverticula, infected urachal cyst, and postoperative changes such as a remaining ureteral stump that retains urine and results in stasis. In such patients with frequent relapses or reinfections, imaging is indicated to detect a treatable condition and monitor its progress.

Overview of Imaging Modalities

Radiography, Intravenous Urography, and Voiding Cystourethrography

Radiography of the abdomen has long been an important examination for detecting calculi, intramural bladder wall calcifications, gas in the wall or lumen of the urinary bladder, and/or foreign bodies that may be the etiology of a UTI. Use of digital tomosynthesis of the abdomen results in improved detection of urinary stones in general over digital radiography, with only a slight increase in effective dose. Historically, intravenous urography (IVU) was the imaging study of choice to evaluate the urinary tract. However, computed tomography (CT) and magnetic resonance (MR) urography have supplanted the use of IVU at most institutions. IVU optimally includes thin-section nephrotomography, which may show renal scarring to indicate prior episodes of pyelonephritis. The weaknesses of IVU include the lack of parenchymal detail, the inability to characterize filling defects, and the inability to visualize adjacent soft-tissue organs. When a bladder diverticulum is at or near a ureteral orifice, voiding cystourethrography should be considered to evaluate the possibility of vesicoureteral reflux. Double-balloon urethrography is useful for demonstration of urethral diverticula. Although this procedure can be technically difficult and may be uncomfortable for the patient, it demonstrates a high level of agreement with MR imaging (MRI) for diagnosis. Cystoscopy is the best method to evaluate bladder-wall pathology suspected on imaging studies. In patients with recurrent UTIs, investigators have found that 9 of 118 (8%) patients had abnormalities on cystoscopy.

Ultrasound, Computed Tomography, and Magnetic Resonance Imaging

CT and MR urography have supplanted the use of IVU at most institutions. Complications of suspected pyelonephritis are best evaluated by CT. CT without and with intravenous contrast has been described as the "examination of choice" in evaluating complicated UTIs for detecting underlying structural problems or complications. The benefits of CT include increased accuracy in detecting calculi (contrast resolution and lack of overlying bowel and bone), increased speed of examination, and increased abdominal detail, allowing, in some cases, an alternate diagnosis to explain patients' signs, symptoms, and laboratory findings.

Ultrasound (US) does not use ionizing radiation, an advantage over CT. US can efficiently measure postvoid residuals within the bladder and detect some bladder diverticula. However, it is less accurate in the detection of pyelonephritis, renal abscess, and urinary tract calculi when compared with other imaging modalities, including CT and MRI. MRI provides improved soft-tissue contrast resolution and sensitivity for contrast enhancement. It does not use ionizing radiation and therefore is favored in patient populations such as pregnant women, children, and patients who require repeated imaging examinations.

Discussion of Imaging Modalities by Variant

Variant 1: "Uncomplicated" with No Underlying Risk Factors

Most women with recurrent symptomatic UTI have normal urinary tracts. A group of researchers showed that women with no risk factors for UTI had a negative predictive value of 93% for normal cystoscopy. Recurrent uncomplicated UTIs do not routinely require cystoscopy or imaging.

Variant 2: "Complicated," or Patients Who Are Nonresponders to Conventional Therapy, Get Frequent Reinfections or Relapses, and Have Known Underlying Risk Factors

Complicated causes of UTI can be evaluated by history and physical examination. Host factors that classify a UTI as complicated include anatomic abnormalities such as cystocele, diverticulum, fistula, indwelling catheters, voiding dysfunction, urinary tract obstruction, and underlying conditions such as pregnancy, diabetes, and immunosuppression. In women suspected of having a recurrent complicated UTI, cystoscopy and imaging should be considered.

Other documented risk factors include prior urinary tract surgery or trauma, gross hematuria after infection resolution, urea-splitting bacteria on culture, prior abdominopelvic malignancy, prior urinary tract calculi, prior diverticulitis, symptoms of pneumaturia, fecaluria, or repeated pyelonephritis.

The following paragraphs discuss the various imaging examinations that may be useful in evaluating women with recurrent complicated UTIs.

Radiography and Intravenous Urography

When calcifications are seen in the bladder wall on radiography, it is often possible to make a correct clinical diagnosis if these findings are viewed in the context of the clinical history, physical examination, appropriate laboratory studies, and further imaging of the remainder of the urinary tract. Bladder-wall calcification is typically due to prior infection with *Schistosoma* (uncommon in the United States, but very common in other parts of the world), tuberculosis, Cytoxan cystitis, or radiation cystitis. For evaluation of the collecting system, IVU may detect the changes caused by reflux nephropathy, papillary necrosis, and subtle urothelial neoplasms, as well as other changes associated with infections such as pyelitis cystica and leukoplakia. The bladder phase of the IVU can usually identify contour abnormalities suggestive of inflammation or neoplasm. Further, the ability of the bladder to empty on voiding can be reasonably assessed. When a bladder diverticulum is at or near a ureteral orifice, voiding cystourethrography should be considered to evaluate the possibility of vesicoureteral reflux.

Computed Tomography

CT is the examination of choice in patients with known underlying risk factors, repeated episodes of reinfection, or persistent infection despite adequate therapy. Not only does CT have the ability to define the extent of the disease, but it also can identify complications such as renal and perirenal abscess, which may be associated with these infections. CT has been found to be superior to US and equal to MRI in the sensitivity and reliability for the detection of acute pyelonephritis. One study has recently shown good correlation between the clinical severity of acute pyelonephritis with severity of the findings on CT in 130 patients. As a result, unenhanced CT has been used predominantly for the emergency patient with "renal colic" and/or hematuria. It has also been used to define the severity and extent of upper-tract calculi, which are sometimes associated with recurrent UTIs. Reduced-radiation protocols for CT are being developed, which result in similar detection of renal stones while reducing patient radiation exposure. CT urography can identify abnormalities of the collecting systems. IVU and CT urography are also useful for detecting or excluding congenital anomalies or obstruction of the urinary tract.

Enterovesical fistulae are usually caused by diverticulitis (cancer is the second most common cause) and are almost all colovesical in nature. Clinical suspicion is frequently raised by the presence of UTI with pneumaturia and/or fecaluria. CT is the primary imaging modality for suspected cases of enterovesical fistulas. A group of researchers found that CT revealed fistulas in 12 of 15 patients (80%). Cystoscopy was performed in 16 patients, with 87.5% positive for fistulas, and barium enema in 8 patients, with 50% positive for fistulas. The authors concluded that CT is the optimum imaging modality for diagnosis, as it can also identify the underlying etiology.

Using a logistic regression model, a group of authors showed that in patients with renal suppurative infection, the risk of incorrect diagnosis is about 14.5 times higher when performing US alone and about 37 times less when using CT. Recent studies show promise in the emerging role of contrast-enhanced US (CEUS) for the initial diagnosis and follow-up of patients with complicated acute pyelonephritis in order to avoid the radiation inherent in CT scans. Using CT as a reference standard, another group of authors demonstrated a sensitivity of 98% and a specificity of 100% for CEUS in the diagnosis of acute pyelonephritis in 100 patients.

Magnetic Resonance Imaging

MRI has been shown to be useful in the diagnosis and follow-up of UTI and acute pyelonephritis. MRI is effective at diagnosing pelvic-organ prolapse. The resultant cystoceles and urinary incontinence associated with pelvic-organ prolapse are significant risk factors for recurrent UTIs in postmenopausal women. MRI best assesses the structure and complexity of urethral diverticula, allowing for accurate diagnosis and improved surgical planning. Given the excellent soft-tissue contrast on MRI, this modality is equally sensitive to CT for evaluating vesicovaginal and enterovesicular fistulae.

MRI is less sensitive than CT for detecting urinary tract calculi. In a study of 149 patients, MR urography demonstrated 69% sensitivity for detecting calculi versus (vs) 100% for CT. However, MR urography has been shown to have increased sensitivity to perirenal fluid and ureteric dilatation in comparison with CT in the setting of acute obstruction. Multiplanar reconstruction images in the coronal and sagittal planes are commonly included in MR urography images to improve visualization of urinary tract abnormalities. MRI may be of greatest value in documenting active upper-tract infection versus scar formation to determine whether therapy has been effective in the high-risk patient. Pregnant women and patients who require multiple imaging examinations may be best served by MRI in order to minimize exposure to ionizing radiation.

A history of recurrent UTI is seen in 30% to 50% of patients with urethral diverticula. Diverticula of the urethra can be evaluated with high sensitivity and specificity by double-balloon urethrography, voiding CT urethrography, and MRI. MRI best assesses the structure and complexity of urethral diverticula, allowing for accurate diagnosis and improved surgical planning. In at least one report, MRI altered the surgical management in 15% of patients. Double-balloon urethrography can be technically difficult and may be uncomfortable for the patient.

Patients with suspected bladder diverticula may be imaged with cystography, US, or CT. Bladder diverticula are unusual in women and are associated with a neurogenic or postoperative bladder; they are rarely congenital. MRI has also been shown to be accurate in the diagnosis of colovesical fistula. The multiplanar imaging capability, lack of radiation, and high soft-tissue resolution inherent to MRI also makes this modality suitable for imaging suspected fistulae, particularly when repeat imaging and radiation doses are of issue. IVU, US, and upper gastrointestinal/small-bowel follow-through have very low yields, making them even less cost-effective.

Ultrasound

US has a limited role in the workup of complicated recurrent UTIs. Hydronephrosis can be demonstrated, as an indication of obstruction, but may not yield a specific etiology. Sonography has a role in bladder evaluation for diverticula and postvoid residual volume determination, either of which may be of interest in this clinical setting. Sonography is generally less sensitive to calculi determination with CT.

Summary of Recommendations

- Women with recurrent UTIs should have one or more additional risk factors to justify urologic or radiologic investigation.
- The basis for radiologic or urologic investigation of women with recurrent UTI is to detect abnormalities that could result in future morbidity.
- CT is a mainstream investigational modality for evaluating UTIs, especially in patients with underlying or known risk factors, episodes of reinfection or infection resistant to conventional therapy. A host of complicating conditions can be detected relatively efficiently and reliably with this modality.
- MRI is useful in evaluation of disease of the urethra as well as for diagnosing organ prolapse and fistula.
- Cystography and urethrography still have roles in assessing abnormalities of the bladder and the urethra.
- US can be used ad hoc in the evaluation of complicated UTIs but can provide only limited information and often not a specific diagnosis.

Abbreviations

- CT, computed tomography
- MR, magnetic resonance
- MRI, magnetic resonance imaging
- US, ultrasound

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
	<0.1 mSv	<0.03 mSv
	0.1-1 mSv	0.03-0.3 mSv
	1-10 mSv	0.3-3 mSv
	10-30 mSv	3-10 mSv
	30-100 mSv	10-30 mSv
*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."		

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Recurrent lower urinary tract infections (UTIs)

Guideline Category

Diagnosis

Evaluation

Clinical Specialty

Family Practice

Internal Medicine

Nephrology

Obstetrics and Gynecology

Radiology

Urology

Intended Users

Health Plans

Hospitals

Managed Care Organizations

Physicians

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of various imaging modalities for the evaluation of recurrent lower urinary tract infections (UTIs) in women

Target Population

Women with recurrent lower urinary tract infections (UTIs)

Interventions and Practices Considered

1. X-ray
    - Abdomen
    - Contrast enema
    - Cystography
    - Voiding cystourethrography
    - Intravenous urography (IVU)
    - Urethrography double balloon
2. Computed tomography (CT), abdomen and pelvis
    - Without and with contrast
    - Without contrast
    - With contrast
3. Ultrasound (US), kidneys and bladder, retroperitoneal
4. Magnetic resonance imaging (MRI), pelvis
    - Without and with contrast
    - Without contrast

Major Outcomes Considered

- Utility of radiologic examinations in the investigation of recurrent lower urinary tract infections (UTIs) in women
- Sensitivity, specificity, and reliability of radiologic examinations for diagnosis and follow-up of UTI

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Summary

Of the 47 citations in the original bibliography, 25 were retained in the final document. Articles were removed from the original bibliography if they were more than 10 years old and did not contribute to the evidence or they were no longer cited in the revised narrative text.

A new literature search was conducted in August 2013 to identify additional evidence published since the *ACR Appropriateness Criteria® Recurrent Lower Urinary Tract Infections in Women* topic was finalized. Using the search strategies described in the literature search companion (see the "Availability of Companion Documents" field), 23 articles were found. Three articles were added to the bibliography. Twenty-eight articles were not used due to either poor study design, the articles were not relevant or generalizable to the topic, the results were unclear, misinterpreted, or biased, or the articles were already cited in the original bibliography.

The author added 22 citations from bibliographies, Web sites, or books that were not found in the new literature searches.

See also the American College of Radiology (ACR) Appropriateness Criteria® literature search process document (see the "Availability of Companion Documents" field) for further information.

Number of Source Documents

Of the 47 citations in the original bibliography, 25 were retained in the final document. The new literature search conducted in August 2013 identified three articles that were added to the bibliography. The author added 22 citations from bibliographies, Web sites, or books that were not found in the new literature searches.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Study Quality Category Definitions

Category 1 - The study is well-designed and accounts for common biases.

Category 2 - The study is moderately well-designed and accounts for most common biases.

Category 3 - There are important study design limitations.

Category 4 - The study is not useful as primary evidence. The article may not be a clinical study or the study design is invalid, or conclusions are

based on expert consensus. For example:

a. The study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description).
b. The study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence.
c. The study is an expert opinion or consensus document.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author assesses the literature then drafts or revises the narrative summarizing the evidence found in the literature. American College of Radiology (ACR) staff drafts an evidence table based on the analysis of the selected literature. These tables rate the study quality for each article included in the narrative.

The expert panel reviews the narrative, evidence table and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the variant table(s). Each individual panel member assigns a rating based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development documents (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Rating Appropriateness

The American College of Radiology (ACR) Appropriateness Criteria (AC) methodology is based on the RAND Appropriateness Method. The appropriateness ratings for each of the procedures or treatments included in the AC topics are determined using a modified Delphi method. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. The expert panel members review the evidence presented and assess the risks or harms of doing the procedure balanced with the benefits of performing the procedure. The direct or indirect costs of a procedure are not considered as a risk or harm when determining appropriateness. When the evidence for a specific topic and variant is uncertain or incomplete, expert opinion may supplement the available evidence or may be the sole source for assessing the appropriateness.

The appropriateness is represented on an ordinal scale that uses integers from 1 to 9 grouped into three categories: 1, 2, or 3 are in the category "usually not appropriate" where the harms of doing the procedure outweigh the benefits; and 7, 8, or 9 are in the category "usually appropriate" where the benefits of doing a procedure outweigh the harms or risks. The middle category, designated "may be appropriate", is represented by 4, 5, or 6 on the scale. The middle category is when the risks and benefits are equivocal or unclear, the dispersion of the individual ratings from the group median rating is too large (i.e., disagreement), the evidence is contradictory or unclear, or there are special circumstances or subpopulations which could influence the risks or benefits that are embedded in the variant.

The ratings assigned by each panel member are presented in a table displaying the frequency distribution of the ratings without identifying which members provided any particular rating. To determine the panel's recommendation, the rating category that contains the median group rating without disagreement is selected. This may be determined after either the first or second rating round. If there is disagreement after the second rating round, the recommendation is "May be appropriate."

This modified Delphi method enables each panelist to articulate his or her individual interpretations of the evidence or expert opinion without

excessive influence from fellow panelists in a simple, standardized and economical process. For additional information on the ratings process see the Rating Round Information document on the ACR Web site.

Additional methodology documents, including a more detailed explanation of the complete topic development process and all ACR AC topics can be found on the ACR Web site (see also the "Availability of Companion Documents" field).

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

Intravenous urography (IVU), ultrasound (US), and upper gastrointestinal/small-bowel follow-through have very low yields, making these tests even less cost-effective.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current literature and expert panel consensus.

Summary of Evidence

Of the 50 references cited in the *ACR Appropriateness Criteria® Recurrent Lower Urinary Tract Infections in Women* document, all of them are categorized as diagnostic references including 2 well-designed studies, 3 good quality studies, and 9 quality studies that may have design limitations. There are 36 references that may not be useful as primary evidence.

While there are references that report on studies with design limitations, 5 well-designed or good quality study provides good evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Selection of appropriate radiologic imaging procedures for the evaluation of women with recurrent lower urinary tract infections (UTIs)

Potential Harms

Relative Radiation Level

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to

estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Qualifying Statements

Qualifying Statements

The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Lazarus E, Allen BC, Blaufox MD, Coakley FV, Friedman B, Fulgham PF, Goldfarb S, Hartman MS, Heller MT, Hosseinzadeh K, Oto A, Porter C, Sahni VA, Sudakoff GS, Verma S, Remer EM, Eberhardt SC, Expert Panel on Urologic Imaging. ACR Appropriateness CriteriaÂ® recurrent lower urinary tract infections in women [online publication]. Reston (VA): American College of Radiology (ACR); 2014.

10 p. [50 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1995 (revised 2014)

Guideline Developer(s)

American College of Radiology - Medical Specialty Society

Source(s) of Funding

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

Guideline Committee

Committee on Appropriateness Criteria, Expert Panel on Urologic Imaging

Composition of Group That Authored the Guideline

Panel Members: Elizabeth Lazarus, MD (*Principal Author*); Brian C. Allen, MD; M. Donald Blaufox, MD, PhD; Fergus V. Coakley, MD; Barak Friedman, MD; Pat F. Fulgham, MD; Stanley Goldfarb, MD; Matthew S. Hartman, MD; Matthew T. Heller, MD; Keyanoosh Hosseinzadeh, MD; Aytekin Oto, MD; Christopher Porter, MD; V. Anik Sahni, MD; Gary S. Sudakoff, MD; Sadhna Verma, MD; Erick M. Remer, MD (*Specialty Chair*); Steven C. Eberhardt, MD (*Panel Chair*)

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Lazarus E, Casalino DD, Remer EM, Arellano RS, Bishoff JT, Coursey CA, Dighe M, Eggli DF, Fulgham P, Goldfarb S, Israel GM, Leyendecker JR, Nikolaidis P, Papanicolaou N, Prasad S, Ramchandani P, Sheth S, Vikram R, Expert Panel on Urologic Imaging. ACR Appropriateness Criteria® recurrent lower urinary tract infection in women. [online publication]. Reston (VA): American College of Radiology (ACR); 2011. 7 p. [47 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the American College of Radiology (ACR) Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

Availability of Companion Documents

The following are available:

- ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2015 Feb. 3 p. Electronic copies: Available from the American College of Radiology (ACR) Web site.
- ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 2015 Feb. 1 p. Electronic copies: Available from the ACR Web site.
- ACR Appropriateness Criteria®. Evidence table development – diagnostic studies. Reston (VA): American College of Radiology; 2013 Nov. 3 p. Electronic copies: Available from the ACR Web site.
- ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2015 Feb. 3 p. Electronic copies: Available from the ACR Web site.
- ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 2015 Feb. 2 p. Electronic copies: Available from the ACR Web site.
- ACR Appropriateness Criteria® recurrent lower urinary tract infections in women. Evidence table. Reston (VA): American College of Radiology; 2014. 19 p. Electronic copies: Available from the ACR Web site.
- ACR Appropriateness Criteria® recurrent lower urinary tract infections in women. Literature search. 2014. 1 p. Reston (VA): American College of Radiology; 2014. 19 p. Electronic copies: Available from the ACR Web site.

Patient Resources

None available

NGC Status

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